

## Lecture 1 at Kyung Hee University

### Kinetic Simulation and Energetic Neutral Atom Imaging of the Magnetosphere

Advanced simulation tools and measurement techniques have been developed to study the dynamic magnetosphere and its response to drivers in the solar wind. The Comprehensive Ring Current Model (CRCM) is a kinetic code that solves the 3D distribution in space, energy and pitch-angle information of energetic ions and electrons. Energetic Neutral Atom (ENA) imagers have been carried in past and current satellite missions. Global morphology of energetic ions were revealed by the observed ENA images. We have combined simulation and ENA analysis techniques to study the development of ring current ions during magnetic storms and substorms. We identify the timing and location of particle injection and loss. We examine the evolution of ion energy and pitch-angle distribution during different phases of a storm. In this talk we will discuss the findings from our ring current studies and how our simulation and ENA analysis tools can be applied to the upcoming TRIO-CINAMA mission.